

Local Hazard Mitigation Plan ANNEX

Contra Costa Water District

1.0 Introduction

Contra Costa Water District (District) provides water to approximately 510,000 people in Contra Costa County. In performing this service, the District operates and maintains a complex system of water transmission, treatment, and storage facilities to supply both treated and untreated (raw) water to its customers. The District employs approximately 340 people primarily in Concord and Oakley and has a budget of approximately \$102 million for FY 05-06. The present value of its property, plants, and equipment is over \$930 million.

The Contra Costa County Water District¹ (the District) was approved by the voters in 1936 as the legal entity to contract, purchase, and distribute water provided by the U.S. Bureau of Reclamation through the Contra Costa Canal. The 48-mile Contra Costa Canal conveys water from the Sacramento-San Joaquin Delta, from Rock Slough and Old River, to eastern and central Contra Costa County.

Figure 1 below, illustrates the District's service area, which encompasses most of central and northeastern Contra Costa County, covering an area of more than 137,127 acres (including the Los Vaqueros watershed area of approximately 19,100 acres). Water is provided to a combination of municipal, residential, commercial, industrial, landscape irrigation, and agricultural customers. Major untreated water municipal customers include the Golden State Water Company (Bay Point), Diablo Water District (Oakley), and the Cities of Antioch, Pittsburg, and Martinez. Treated water is distributed to individual customers living in the following communities in the Treated Water Service Area: Clayton, Clyde, Concord, Pacheco, Port Costa, and parts of Martinez, Pleasant Hill, and Walnut Creek. In addition, the District treats and delivers water to the City of Brentwood, Golden State Water Company (Bay Point), and the City of Antioch.

For the first 25 years of its existence, the District's main responsibility was the purchase and distribution of untreated water through the Contra Costa Canal. In the late 1950s, the District purchased the California Water Service Company's Concord-area treatment, pumping, storage, and distribution facilities. In 1968, the District replaced the old treatment facilities with the construction of its own Ralph D. Bollman Water Treatment Plant (Bollman WTP) in Concord. The Bollman WTP now provides treated water to approximately 230,000 people in the central county area and by contract to Bay Point. In 1992, the District completed the Randall-Bold Water Treatment Plant (Randall-Bold WTP) in Oakley that is jointly owned with the Diablo Water District (DWD). The Randall-Bold plant provides treated water to DWD, and by contract, to the City of Brentwood and the City of Antioch. Additionally, the Multi-Purpose Pipeline, constructed in 2003, allows the District to serve new customers in Central Contra Costa County from the Randall-Bold WTP.

¹ In 1981, "County" was dropped from the name.

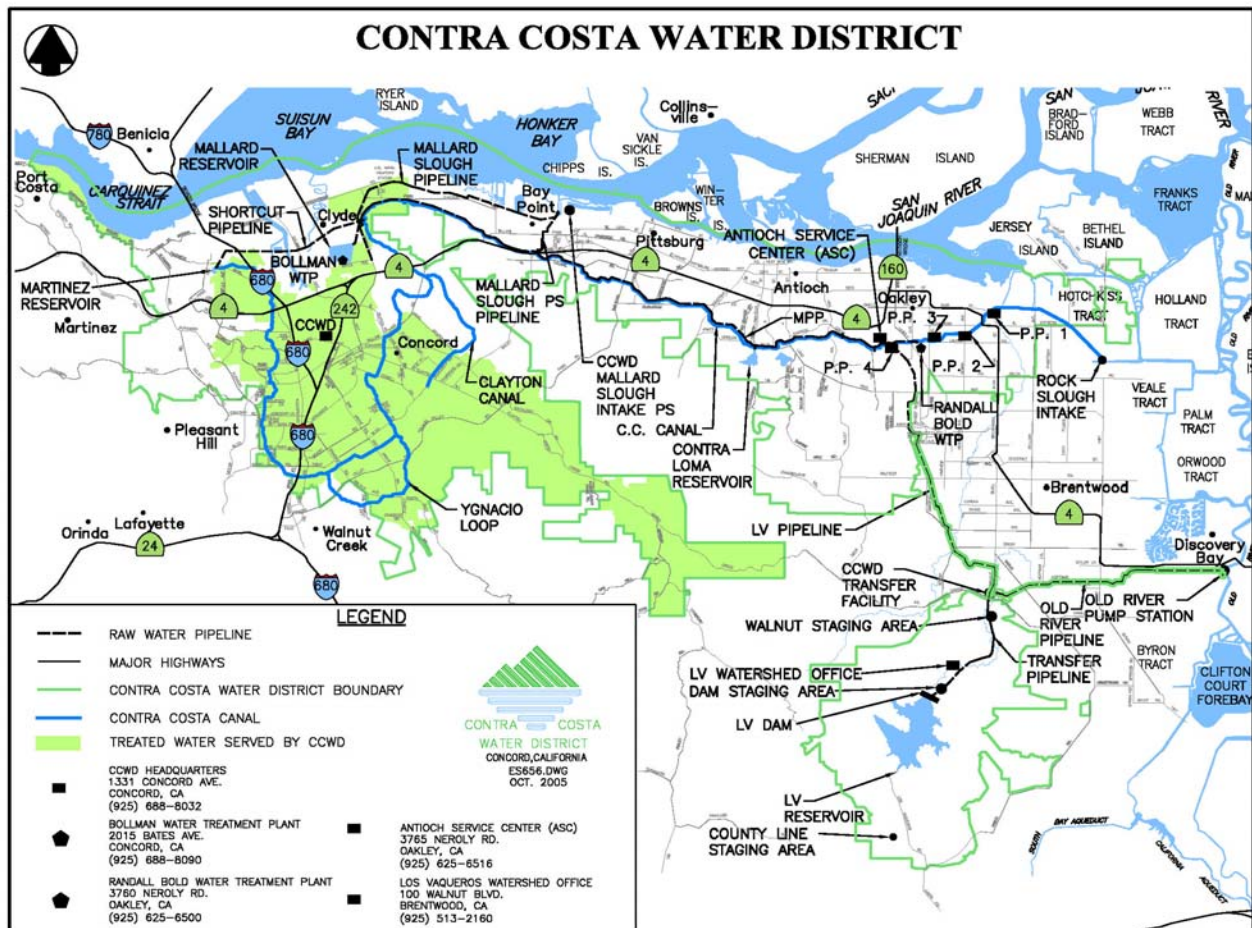


Figure 1 – District Service Area

1.1 Water Supply

The District is a Central Valley Project (CVP) contractor, historically relying almost entirely on the federal government (the Bureau of Reclamation) to supply its water through the Sacramento-San Joaquin Delta. A long-term water service contract with Reclamation provides for the operation of the Los Vaqueros Project, and for a maximum delivery of 195,000 acre-feet per year from the CVP, with a reduction in deliveries during water shortages, including regulatory restricted and drought years.

Other District supplies include water rights at Mallard Slough for a maximum diversion of Delta water of up to 26,700 acre-feet per year. This water however, is subject to quality degradation and can only be used intermittently. Additionally, the District has a contract with the East Contra Costa Irrigation District (ECCID) for untreated water that can be treated and used in areas in East Contra Costa County within the boundaries of both the District and ECCID, and for additional drought supplies available through groundwater exchange. The District also has an ongoing program to obtain additional sources for use during drought periods and to provide for future demands.

On June 2, 1994, the State Water Resources Control Board (SWRCB) granted the District additional rights to divert and store water for beneficial uses. The SWRCB subsequently issued

permits for filling Los Vaqueros Reservoir from the new intake at Old River. Diversion from the Old River intake for delivery to the District's service area began in the summer of 1997. Construction of the reservoir was completed in January 1998 and the reservoir was filled to 100,000 acre-feet for the first time in January 1999. Annually, up to 95,850 acre-feet may be diverted for storage between November 1 of each year and June 30 of the succeeding year. This high quality reservoir water is blended with Delta water to improve delivered water quality as needed.

1.2 Untreated Water System

The Contra Costa Canal is the District's major water supply facility, and consists of a 4-mile earth-lined channel that begins at Rock Slough and leads into the 44.6-mile concrete-lined canal. The canal passes through many of the cities and communities in the northeastern and central portions of the county before ending at the Martinez Reservoir. Water is supplied to the canal from Old River via the Los Vaqueros Project pipelines and from Rock Slough. A series of four pump stations (Pumping Plants One through Four) lift the water from Rock Slough 126 feet above sea level, after which gravity propels the water to its terminus in Martinez. Four reservoirs--Contra Loma Reservoir, Martinez Reservoir, Mallard Reservoir, and Los Vaqueros Reservoir--provide approximately 110,000 acre-feet of storage capacity.

The Los Vaqueros Project, completed in 1998, includes a 100,000 acre-foot reservoir, intake and pump station at Old River, and transmission facilities. Water diverted from Old River can be stored in the Los Vaqueros Reservoir or conveyed by pipeline to the canal system. In addition to emergency storage, the Los Vaqueros Reservoir provides high quality water for blending when Delta water quality is poor. Contra Loma Reservoir is used to provide emergency storage, regulate flows in the Canal, meet peak flows, and provide back up during canal maintenance. Mallard Reservoir and Martinez Reservoir serve as terminal storage for flow regulation and emergency use. The USBR owns Contra Loma and Martinez Reservoirs and the Contra Costa Canal; however, the District is responsible by agreement for operation and maintenance.

1.3 Treated Water System

The District operates two water treatment facilities, the 75 MGD Bollman Water Treatment Plant in Concord and the 40 MGD Randall-Bold Water Treatment Plant in Oakley. The Bollman plant serves the District's treated water customers in Central Contra Costa County, and under special agreement, provides treated water to Bay Point. The Randall-Bold plant currently provides treated water to the Diablo Water District and the cities of Brentwood and Antioch. Additionally, the Multi-Purpose Pipeline, constructed in 2003, allows the District to serve new treated water customers in Central Contra Costa County from the Randall-Bold facility.

Treated water distribution facilities include more than 800 miles of pipeline and 40 active storage reservoirs. Total treated water storage capacity is approximately 70 million gallons. Thirty pump stations are used to deliver the water and maintain water pressure within the distribution system. There are approximately 60,240 active service connections to the treated water system, servicing approximately 134,161 equivalent 5/8-inch connections.

2.0 The Planning Process

The process of preparing this Local Hazard Mitigation Plan Annex (the Annex) is familiar to the District. The District complies with the requirements of the California Environmental Quality Act (CEQA), which since 1988 has required mitigation for identified natural hazards. The District has completed several hazard mitigation studies and projects in recent years. Related plans and studies include the District's Emergency Operations Plan and Emergency Action Plans for three of the District's dams. The dams themselves are subject to regular, periodic safety reviews by the Division of Safety of Dams (DSOD) and the United States Bureau of Reclamation's Safety Evaluation of Existing Dams (SEED) program. In addition, the District updates its Capital Improvement Program (CIP) on an annual basis; projects designed to protect health and safety are designated as Priority Level 1, "must do" projects, and projects that are already under construction, and those required by legislation, regulation, and contract are also categorized as Priority Level 1. Finally, the District routinely holds tabletop and field exercises to test its emergency preparedness for natural and man-made disasters. The District's efforts result in a series of on-going facility retrofits, improvements, and construction of new projects.

With respect to this Annex, the District has focused on evaluating its existing programs and identifying gaps that may lead to disaster vulnerabilities in order to address these risks through mitigation. The District has attended meetings/workshops hosted by ABAG and has submitted its inventory of critical facilities and responses to mitigation strategies prepared by ABAG.

On July 13, 2005 the District participated in a workshop conducted by the City of Pleasant Hill during the preparation of its Annex with representatives from Pleasant Hill Police, Contra Costa Fire Department, East Bay Municipal Utility District, City of Martinez, and Central Contra Costa Sanitary District. The purpose of the meeting was to review the strategies on all hazards in Pleasant Hill and to ensure that the combined agencies had addressed all the hazards.

Key District staff met on several occasions to identify and prioritize mitigation strategies appropriate for the District. The Planning Department staff reviewed the District's general priorities, ongoing mitigation projects, future projects currently in the CIP, and determined appropriate District staff for internal review of the Local Hazard Mitigation Plan Annex. The Planning Department in collaboration with representatives from the Engineering and Construction Department reviewed the findings from the hazard and risk assessment, reviewed the proposed mitigation activities, built consensus on key projects and their associated preliminary budgets, and defined potential funding sources for mitigation strategies designated as "High" priority. The District provided the opportunity for the public to comment on the DRAFT mitigation strategies selected by staff at the Operations and Engineering Meeting held on December 19, 2005. The District's Board of Directors adopted the resolution approving and adopting the plan and strategies at the February 1, 2006 Board Meeting. The mitigation strategies are an implementation appendix to this Annex.

3.0 Hazard and Risk Assessment

The ABAG Multi-Jurisdictional Local Hazard Mitigation Plan, to which this is an Annex, lists nine hazards that impact the Bay Area, five related to earthquakes (faulting, shaking, earthquake-

induced landslides, liquefaction, and tsunamis) and four related to weather (flooding, landslides, wildfires, and drought). With the exception of tsunamis, these hazards also impact the District.

ABAG's Multi-Jurisdictional Hazard Mitigation Plan did not include specifics on water treatment and distribution facilities, and specific water contamination, water distribution, water supply, and water source issues were not addressed. However, a detailed discussion of these issues and hazards are discussed in the following related District studies and reports.

- Canal Drainage Study - 1995-1998 (Phase I & 2)
District Regulation 6.24.110 states that the District's objective is to eliminate the discharge of surface water drainage into the Contra Costa Canal. The Canal Drainage Studies (1995-1998) focused on managing stormwater drainage discharge and identified more than 230 storm drains that discharge directly to the Canal, some of which represent a potential source of water quality degradation and increased flooding risk.
- Seismic and Reliability Improvement Project – 1997
This Project was a comprehensive assessment of the seismic vulnerability of District untreated water and treated water systems. All projects consist of standard methods for addressing seismic vulnerability, with specific attention on District facilities potentially facing the greatest impact from a seismic event on the Concord/Green Valley fault.
- Raw Water Renewal/ Replacement Study – 1998
This was a comprehensive study that evaluated the renewal and replacement of the District's untreated (raw) water facilities, principally the Contra Costa Canal. Many of the District's untreated water facilities are over 60 years old. The focus of this planning effort was to prioritize projects for renewal and replacement in the development of future capital improvement projects.
- Emergency Operations Plan (EOP) – August 2001
The District prepared an Emergency Operations Plan (EOP) to take specific emergency response actions following a significant flood, earthquake, or wildfire that affects the untreated water facilities (diversions, pumping plants, reservoirs, canals, pipelines, and laterals) and the treated water facilities (treatment plants, transmission pipelines, pumping stations, reservoirs, and distribution centers). The EOP details the District's methods to analyze the type and severity of the emergency; provide emergency assistance to save lives; reduce the probability of additional injuries or damage; perform emergency repairs based on priority demand; return the system to normal functioning; and evaluate the response and update the preparedness plan.
- Raw Water Facility Improvement Plan Update – 2001
The Raw Water Facilities Improvement Plan Update is part of the Untreated (Raw) Water Facilities Improvement Program that funds renewal and replacement of the Contra Costa Canal and includes activities like canal lining replacement and pump station rehabilitation.

- Treated Water Master Plan Update – 2003

This update to the Treated Water Master Plan addresses the existing deficit in emergency storage with a combination of reliability improvements, including backbone pipes and pumps, emergency generators, and new storage in areas with significant deficits.
- Water System Vulnerability Assessment – 2003

As mandated by federal law following the September 11, 2001 terrorist attacks, the District undertook a Water System Vulnerability Assessment that examined the security vulnerabilities of the both the untreated and treated water systems to postulated design basis threats.
- Water Treatment Plant Master Plan – 2003

The Master Plan is part of the Water Treatment Facility Improvements program entails capital improvements related to the District's water treatment facilities. The plan prioritizes the renewal and replacement, regulatory, and reliability needs at the Bollman and Randall-Bold Water Treatment Plants. It also addressed the need to create new water storage to alleviate significant existing emergency storage and operational deficiencies in Subzone 34.
- Treated Water Renewal/Replacement Study – 2005

The Treated Water Renewal/Replacement Study is an update to the 1996 Treated Water Renewal and Replacement Study and considers the 2002 Treated Water Master Plan Update. The study prioritizes major pipeline repairs and replacements, intertie installations, rehabilitation of pump stations, seismic valves at critical reservoirs, and seismic improvements for key transmission mains that cross the Concord fault.
- Structural Assessment of 22 Bridges – 2005

The Structural Assessment of the District's maintenance bridges that span the Contra Costa Canal was completed as part of the FY 2005-06 Raw Water Facilities Improvement Project. Many of these bridges are aging and in need of repair and/or replacement.
- Emergency Generator Projects – 2005

The Emergency Generators Projects include installation of emergency generators at Seminary and San Miguel Pump Stations as well as the District's O&M and Administration buildings to address the seismic vulnerability of the loss of power to critical pump stations in the District's Treated Water Service Area, and to maintain the District's O&M and Administration buildings as the back-up Emergency Operations Center (EOC) for the District.
- District Dam Emergency Action Plans, updated annually

All District dams have Emergency Action Plans (EAPs) that spell out specific actions and responses to identified potential failure conditions. Emergency notification of proper authorities including local police and fire department, regulatory agencies (USBR, and CA DSOD), CA OES, and others is provided in the EAP. EAPs are reviewed and updated as necessary on a regular basis and exercise tests are periodically conducted to determine the adequacy of the plans.

- **Annual Capital Improvement Programs (CIPs)**

The CIP provides a comprehensive review of the asset investments required over a 10-year period to ensure adequate water resources, maintain high quality water, and meet the service needs of present and future customers. The current CIP is composed of ten programs containing 57 separate projects that are proposed for inclusion in the District's budget process.

The District examined the hazard exposure of the District service area based on information contained in previous District studies and the general hazard maps developed by ABAG (<http://gis.abag.ca.gov>). Information on disasters declared in Contra Costa County is at <http://quake.abag.ca.gov/mitigation/disaster-history.html>.

Of the District's service area, which encompasses most of central and northeastern Contra Costa County and approximately 19,000 acres that comprise the Los Vaqueros watershed, the following findings are made relative to impacts to Infrastructure:

- ◆ **Earthquake faulting** – The Concord/Green Valley and the Greenville faults lie within the District's service area. The Concord/Green Valley fault intersects the northern and western portion of the District's service area in Concord, Pleasant Hill, Walnut Creek, and Martinez, while the Greenville Fault lies west of Los Vaqueros Reservoir in the eastern portion of the District Service area. There are other potential seismic sources such as the Coastal Range Sierra Block Zone, Mt. Diablo thrust, and more distant Calaveras, Hayward, and San Andreas faults.
- ◆ **Earthquake shaking** – The cities of Concord, Martinez, Pleasant Hill, and northeast Walnut Creek would experience violent to very strong shaking during a magnitude 6.7 earthquake on the Concord/Green Valley fault. The remainder of the District's service area would experience very strong (Clayton) to strong/moderate shaking in Antioch and Oakley. During a 6.9 M earthquake on the Greenville Fault, the majority of the District service area, with the exception of the Los Vaqueros Watershed, would experience very strong to strong shaking with moderate shaking in the western portion of the District's service area. The Los Vaqueros Watershed would experience violent to very strong shaking during an earthquake of this magnitude on the Greenville Fault.
- ◆ **Earthquake-induced landslides** – The California Geological Survey has not completed mapping of this hazard in Contra Costa County. However, because few areas have been mapped as landslides, this hazard is viewed as similar to that posed by weather-related hazards.
- ◆ **Earthquake liquefaction** – Currently there is no mapping available for Contra Costa County Earthquake Liquefaction Study Zones and Earthquake Landslide Study Zones performed by the California Geological Survey. The District has evaluated, or mitigated specific liquefaction threats.
- ◆ **Tsunamis** – Tsunamis are not a threat to the District's service area.
- ◆ **Flooding** – Some areas of the District's Service Area lie within the FEMA 100-yr floodplain, but these areas generally are located along the northern most

portion of Contra Costa County. In particular, flooding from Mallard Slough, Walnut Creek, Pacheco Creek, and Galindo Creek could cause damage to water transmission lines and impinge on Mallard Reservoir. The Old River Pumping Plant, which is the intake for Los Vaqueros and an alternate intake for the Contra Costa Canal are protected by levees. Both WTPs are outside the FEMA 100-year flood plains.

- ◆ **Landslides** – Most of the District service area’s facilities are located in areas with little to no landsliding and the risk from this hazard is low except as noted below.
- ◆ **Wildfires** – The wildland urban interface creates fire-threatened communities. In the District’s Service area, large portions of land surrounding Martinez, Pleasant Hill, northeastern Walnut Creek, Clayton, Pittsburg, Antioch, and Oakley are considered fire-threatened communities. The District is committed to providing an adequate supply of water for fire fighting. Wildfire hazard is a major consideration for making necessary improvements to the reliability of the District’s untreated and treated water supplies. The District maintains a comprehensive fire prevention program for the Los Vaqueros Watershed, including maintaining firebreaks and conducting controlled burns.
- ◆ **Dam Inundation** - The District has prepared Emergency Action Plans (EAPs) for its reservoirs to address two cases: 1) dam failure during the Probable Maximum Flood (PMF) and the 2) sunny day failure to comply with USBR, DSOD, and OES requirements. The EAPs show the inundation boundaries downstream of the dams for these two conditions. For the USBR-owned dams--Contra Loma, and Martinez--the District has assessed the potential for loss of life; with respect to Los Vaqueros and Mallard reservoirs (the two District-owned facilities), a risk assessment has not been performed.

The District has assessed all of the dams for the PMF levels. Since these reservoirs are all off-channel reservoirs, the risk of flooding during the PMF is less than for typical on-stream facilities. With respect to earthquake loading, the District’s dams have all been analyzed for the maximum credible earthquake (MCE). The District also has instrumentation and monitoring at all reservoirs to monitor the safety of the dams under normal, unusual (flooding), and extreme (earthquake) operating conditions.

- ◆ **Drought** – The District’s plans for dealing with drought are documented in the Future Water Supply Study and Urban Water Management Plan. Both documents are updated by the District every 5 years and include an evaluation of water demands, conservation, and existing and potential supplies.

The District also examined the hazard exposure of infrastructure based on the information on ABAG’s website at <http://quake.abag.ca.gov/mitigation/pickdbh2.html>. Of the District’s 98 critical facilities, those located in the District’s Treated Water Service area are the most vulnerable, primarily to damage caused by earthquake shaking from the Concord-Green Valley fault; liquefaction from the same fault, and liquefaction from the Greenville fault. The following results do not include impacts to the Contra Costa Canal or the Districts pipelines because ABAG’s hazard exposure model does not include linear facilities. The Canal and key pipelines, however, are crucial to providing water to our customers. As such, mitigation strategies for these

linear facilities rank high even though exposure is not explicitly stated in the following paragraphs.

- ◆ **Earthquake faulting** – The major seismic threat is the Concord-Green Valley fault, which transverses the District’s Treated Water Service Area. The entire Treated Water Service Area would be affected by a major earthquake on this fault. The Greenville Fault is located directly west of the Los Vaqueros Watershed and poses a seismic threat primarily to the Los Vaqueros Dam.
- ◆ **Earthquake shaking** – A 6.7 magnitude earthquake on the Concord-Green Valley *fault* would produce strong shaking at the Martinez Dam and Reservoir, 15 covered reservoirs and associated pump stations, and 6 tanks. Very strong shaking would occur at the Mallard Reservoir, 6 covered reservoirs, 8 pump stations, the Bollman WTP and Pump Station, and the District’s Administration and O&M buildings, Concord Maintenance Shop, District Center, and Corporation Yard. The Mallard Slough Pump Station and Arbolado Pump Station would experience violent shaking.

A large earthquake on the *Greenville fault* would produce violent shaking at the Los Vaqueros Dam and Reservoir, and to portions of the District’s Treated Water Service Area that exist in areas prone to liquefaction (northern portion along the fringes of Suisun Bay). Besides Los Vaqueros, the Old River Pipeline and Pump Station and Pumping Plants No., 1, 2, 3, and 4 would experience moderate to strong shaking in a 6.9 magnitude earthquake on the Greenville fault.

- ◆ **Liquefaction Susceptibility** – The Port Costa Tank, Los Vaqueros Reservoir, and the Willow Pass and Ygnacio pump stations exist in areas with high susceptibility to liquefaction.
- ◆ **Earthquake Induced Liquefaction** - This hazard has not been evaluated for the District’s service area. However, in general, except as noted below, there are few landslide-prone areas in the District’s service area.
- ◆ **Earthquake-induced landslides** – This hazard has not been evaluated for the District’s service area. Except as noted below, there are few landslide-prone areas in the District’s service area
- ◆ **Flooding** – In the District’s Treated Water Service area, the Mallard Slough Pump Station is located in an area designated within the 100-year floodplain (i.e., 1% annual chance of flooding). The Old River Pumping Plant is located in the 500-year flood plain.
- ◆ **Landslides** –Two tanks, two pump stations, Rancho Paraiso Reservoir, and the District’s Kregor Peak Communications Tower are located in areas of historic landsliding.
- ◆ **Wildfires** – Most of the District’s Service Area exists in an urban/wild land interface, with large areas subject to high to very high fire danger. In addition to the Los Vaqueros Watershed, the wildfire threat is high to very high for 9 covered reservoirs, 6 pump stations, 4 tanks, and the Kregor Peak Communication Tower.

- ◆ **Dam Inundation** – All of the District’s buildings in Concord (Administration, Maintenance, Corporation Yard, District Center, and O&M) as well as the Contra Loma and Ygnacio Canal Relift pump stations exist in a dam inundation area (1 dam).
- ◆ **Drought** – is not a hazard for the District’s critical facilities.

The District plans to work with ABAG during 2005 and 2006 to improve the risk assessment information being compiled by ABAG by providing information on critical infrastructure components with respect to their vulnerability to earthquake-induced landslides and liquefaction as a result of earthquakes on the Concord/Green Valley and Greenville faults. As these impacts are not fully developed, the District has reviewed the hazards identified and ranked the hazards based on past disasters and expected future impacts. The conclusion is that earthquakes (particularly shaking) and the potential for earthquake induced landslides (including unstable earth), as well as wildfires pose a significant risk for potential loss.

4.0 Mitigation Activities and Priorities

Various departments within the District (Planning, Engineering, and Operations & Maintenance) met to review mitigation activities and priorities. Decisions on prioritizing projects were made based on a variety of criteria, not simply on an economic cost-benefit analysis. The most important criteria was the potential projects’ responsiveness to the District’s mission to provide a safe, reliable source of untreated and treated water; other criteria included technically and administrative feasibility, politically acceptable, socially appropriate, legal, economically sound, and not harmful to the environment or our heritage.

The following five projects are based on findings from the Seismic Reliability Improvement Program (1997), which the District undertook to provide a comprehensive assessment of the seismic vulnerability of District untreated water and treated water systems. All projects consist of standard methods for addressing seismic vulnerability, with specific attention on District facilities potentially facing the greatest impact from a seismic event on the on the Concord/Green Valley fault. The Concord/Green Valley Fault generally traverses the District’s Treated Water Service Area from southeast to northwest and has the potential to cause significant damage including loss of water service, loss of firefighting capability and localized flooding and damage due to uncontrolled water discharge to water infrastructure and to above ground structures from collapse and fire. Additionally, the Contra Costa Canal Replacement project would provide flood control and increase system security.

To mitigate against the potential disasters caused by these conditions, the District has identified five projects as high priority projects. These projects include two backup generators, structural improvements to large diameter treated water transmission mains where they cross the Concord Fault, construction of a new 1.5 million gallons (MG) of emergency storage capacity, and replacement of the Contra Costa Canal. These projects are candidates for Pre-Disaster Mitigation grants based on their impact to improving public health and safety following a seismic disaster.

1. Seminary and San Miguel Pump Station Generators

Loss of power to pump stations in the District's service area could result in the loss of potable water service, and loss of firefighting capability, as reservoirs are depleted and unable to be refilled. The Seminary and San Miguel Pump Station Generators Project will address the seismic problem of the loss of power to critical pump stations in the District's Treated Water Service Area. The project consists of installing 300 kW generators at the San Miguel Pump Station and the Seminary Pump Station to provide water service after a seismic event on the Concord/Green Valley Fault to prevent the treated water service areas served by these facilities from draining so that fire flows and potable water service are available.

2. O&M/Administration Buildings Emergency Generator

The District's O&M and Administration buildings house the maintenance offices, supplies, and equipment; the engineering, planning, and construction offices; all water system records and drawings; and serve as the back-up Emergency Operations Center (EOC) for the District. Currently, these buildings do not have backup electrical power. Rapid response by District staff to isolate, repair, and otherwise mitigate damaged water facilities in the event of an emergency is necessary to maintain firefighting capability and provide potable water supply. An earthquake on the Concord/Green Valley Fault has the potential to cause significant damage to treated and untreated water facilities during an earthquake, which would likely also result in a loss of power to the O&M and Administration buildings. In the event of an emergency, a loss of power at the O&M and Administration buildings could result in a loss of vital functions to the District and its customers. This project will address this problem by purchasing and installing a 750 kW standby generator adjacent to the O&M and Administration buildings, constructing site improvements, including a concrete pad and sound enclosures, and making all electrical connections needed to provide backup power in the event primary power is lost to the site.

3. TWRI-Fault Crossing Project

In the event of an earthquake on the Concord-Green Valley Fault, failure of the large diameter transmission mains and service lines could cause disruption to the Treated Water Service Area, including loss of potable water service, loss of firefighting capability, and localized flooding and damage due to uncontrolled water discharge. This project will address the seismic problem of large transmission mains and service lines crossing the Concord/Green Valley Fault. The proposed project consists of constructing bypass manifolds and isolation valves, which are standard methods for addressing seismic vulnerability of transmission mains that cross active faults. Isolating and bypassing broken pipelines following a seismic event has been successful in the past and is an integral component of earthquake disaster response for water utilities in California.

4. Midhill Reservoir II Project

Adequate emergency storage is required to maintain the District's goals for service following a stress event. This project will provide 1.5 million gallons (MG) of emergency storage capacity in the District's Treated Water Service Area and will provide additional reliability and operational flexibility for District Subzones 23, 25, and 33, which serve over 50,000 customers located in the cities of Martinez and Pleasant Hill and in Contra Costa County (Pacheco),

consisting of residential, commercial and industrial land uses. The project was identified in District's FY03 Treated Water Service Area Master Plan as a high priority project. This reservoir will alleviate an existing deficiency in emergency storage and will serve to meet fire flow and potable water supply requirements during an emergency. Construction will take place at one location and consists of construction of a 1.5 MG reinforced concrete water storage tank. The reservoir will be rectangular (versus circular) to fit the ridge site efficiently, and will be 148 feet long and 74 feet wide. The tank bottom elevation will be 301 feet, and the operating maximum water surface elevation at 320 feet, to match the existing Midhill I Reservoir. The project will also include related pipeline improvements and isolation valves.

5. Contra Costa Canal Replacement

The existing berms and levees along the Contra Costa Canal are not certified to flood control standards established by the Federal Emergency Management Agency (FEMA). An engineering and geotechnical study completed in 2002 confirmed the vulnerability of the berms and levees to a significant seismic event. The soils along the sides of the Canal were not engineered for flood protection. Development in select locations along the Canal would be vulnerable without sufficient flood protection in the event of elevated water stages in the Delta.

In addition, the historically agricultural land uses adjacent to the Canal are being converted to urban development. The Contra Costa Canal Replacement project is imperative to ensure compatibility with adjacent land uses, and manage and minimize potential risks to CCWD customers and surrounding neighborhoods. There is currently a population of 10,000 in the immediate area that would be affected by failure of the facility. By 2007, ongoing rapid residential development will result in 30,000 residents endangered by this facility including three primary/secondary schools. Failure of this facility would also compromise the water supply for nearly 500,000 people.

The replacement project will remove the potential for flooding. By encasing the Canal in a buried pipeline, virtually all concerns with regard to system security and public safety are alleviated as well. Fences will be maintained along the 300-foot right of way boundary, maintenance roads will be maintained, and security personnel will patrol the area.

Over time, the District is committed to developing better hazard and risk information to use in making those trade-offs. We are not trying to create a disaster-proof region, but a disaster-resistant one. In addition, several of the strategies are existing District programs.

These draft priorities and the District's responsible department were reviewed by key District staff. The draft priorities were provided to Board members at the Operations and Engineering (O&E) meeting on December 2, 2005. The public was provided with an opportunity to comment on the DRAFT priorities. The final strategies (as shown in the attached Table) will become an *Implementation Appendix* to Contra Costa Water District's Annex. Unless otherwise noted, the responsible agency for these strategies is Contra Costa Water District.

The District will use proven mechanisms to ensure that the projects and mitigation strategies identified as existing or having relatively high priorities in this Annex are implemented. The primary vehicle for project approval and implementation is the District's Capital Improvement Plan (CIP). On an annual basis, the CIP provides a comprehensive review of the asset investments required over a 10-year period to ensure adequate water resources, maintain high

quality water, and meet the service needs of present and future customers. A key driver for the identification of the asset investments is the vulnerability of the asset to natural disasters identified in this Annex.

The asset investments are conceived and developed by the District's Planning, Engineering, Construction, Operations and Maintenance, and Watershed and Lands Departments, and consist of both administrative and emergency projects with varying degrees of priority. The asset investments provide the basis for development of the District's annual operating budget and are subject to Board approval/resolution.

The CIP has proven a viable mechanism for implementing mitigation strategies. For example, to address the vulnerability of critical District infrastructure, the District completed a comprehensive Seismic and Reliability Improvements Project (SRIP) that was formally adopted by the Board of Directors in 1997. The SRIP contains three elements that mitigate against damage and loss of fire-fighting capability following a major earthquake. All three of these projects are detailed in the CIP:

- a) *The Multi-purpose Pipeline Project Phase 1* (completed in 2004) involved design and construction of a 21-mile pipeline from Oakley to Concord with connections to the Contra Costa Canal, Mallard Slough Pipeline, and the City of Antioch; a 35 million gallon per day (mgd) pump station, emergency power facilities, and miscellaneous canal improvements. Phase 2, scheduled and budgeted to begin in FY 2013 includes a 4-mile long untreated water pipeline and a 36 mgd untreated water pump station in Antioch.
- b) *Mallard Slough Pump Station Project* ensured reliable delivery of untreated water from Mallard Slough. This project involved rebuilding of an aging pump station including the construction of a new pipeline to increase the reliability of untreated water delivery. The project was completed in 2003.
- c) *Untreated Water Seismic Improvements Project*, of which canal replacement and levee improvements are major components with high priority designations due to the potential for millions of dollars in property damage due to levee failure and threat to the District's ability to convey untreated water.

In addition, the District may, in the course of reviewing the infrastructure mitigation strategies that have not yet been considered, identify activities with high or very high priorities and may seek funding support for initiation of those activities.

5.0 The Plan Maintenance and Update Process

The District will ensure that *monitoring* of this Annex will occur. The plan will be monitored on an on-going basis. However, the major disasters affecting our community, legal changes, notices from ABAG, as the lead agency in this process, and other triggers will be used. Finally, the Annex will be a discussion item on the agenda of the meeting of department heads at least once a year in April. At that meeting, the department heads will focus on *evaluating* the Annex in light of technological and political changes during the past year or other significant events. This group will be responsible for determining if the plan should be updated.

The District is committed to reviewing and updating this plan annex at least once every five years, as required by the Disaster Mitigation Act of 2000. The District will contact ABAG four years after this plan is approved to ensure that ABAG plans to undertake the plan update process. If so, the District again plans to participate in the multi-jurisdictional plan. If ABAG is unwilling or unable to act as the lead agency in the multi-jurisdictional effort, other agencies will be contacted, including the County's Office of Emergency Services. Counties should then work together to identify another regional forum for developing a multi-jurisdictional plan.

The **public** will continue to be involved whenever the plan is updated, and as appropriate during the monitoring and evaluation process. Prior to adoption of updates, the District will provide the opportunity for the public to comment on the updates. A public notice will be posted prior to the meeting to announce the comment period and meeting logistics.